CHAPTER 3 – DESIGN PROCEDURES AND GUIDELINES

3.1 DESIGN PROCEDURES

3.1.1 Potable Water

The Developer will meet with the Engineering Department and bring a preliminary site plan showing the potable system layout in blue pencil. Before submittal of layout the Developer must, in sequence, do the following:

A. Meet with the City Fire Marshal and establish protection equipment.

B. Prepare a colored recycled water use map and submit to the City Planning Department for processing and approval.

C. Schedule a meeting with the Engineering Department for review, comment, and approval of the preliminary system layout usage (gpm) plan for potable and recycled systems prior to the preparation of mylar improvement plans.

The site plan to be used for the layout must show the existing and proposed underground utilities (sewer, electric, gas, storm drain, etc.), the paved areas, the slopes, the signs and structures which will affect the potable water system layout. This project is approved upon the expressed condition that building permits will not be issued for development of subject property unless the water district serving the development determines that adequate water service and sewer facilities are available at the time of application for such water service and sewer permits will continue to be available until time of occupancy.

3.1.2 Recycled Water

The Developer will meet with the District and bring a site plan showing the recycled system layout in purple pencil. Before submittal of layout the Developer must, in sequence, do the following:

A. Meet with his landscape designer and establish the irrigational flow demands (GPM) for all landscaped areas and establish the service connection point(s).

B. The Developer must obtain and consolidate the existing and proposed water system improvement plans to the recycled layout plan and include proposed connection points.

C. The site plan to be used for the layout must show the existing and proposed underground utilities (sewer, electric, gas, storm drain, etc.), the paved areas, the slopes and the signs and structures which will affect the recycled water system layout.

3.2 PLANNING AND DESIGN CRITERIA

3.2.1 Water Flow Generation

The following domestic water supply demands are used in the development of the water system.

A. Residential

Average daily flow 550 GPD/Single Family per dwelling unit
250 GPD/Multi-Family per dwelling unit

B. Non-Residential

Average daily flow 2,300 GPD/10,000 Sq. Ft.

C. Fire Flow

As a general guide, the following design criteria shall be used for determining fire flow requirements. The Fire Marshal will normally determine the specific fire flow criteria for a project.

1. Residential dwelling units shall use a minimum of 1,500 gpm from any two hydrants at a minimum of 20 psi of residual pressure at the main for 2 hours duration.

2. Multi-family residential units shall use a minimum of 3,000 gpm from any two hydrants at a minimum of 20 psi of residual pressure at the main for 2 hours duration.

3. Schools, commercial and industrial areas shall use a minimum of 4,000 gpm for 4 hours duration out of four hydrants at a minimum of 20 psi of residual pressure at the main. Higher requirements may be required if building floor area exceeds 300,000 square feet or is located near open space.

3.2.2 District Pipeline Sizing Criteria (Maximum Friction, Slopes, Velocities, Etc.)

A. Water System Design Criteria

1. Approximately one pressure zone is required for each 100 feet change in elevation.

2. Minimum static pressure of 60 psi.

3. Maximum static pressure of 125 psi. Pressures up to 150 psi may be allowed with specific approval of the City Engineer.

4. Use existing pressure zones if they are compatible.

5. Static pressures are figured from the tank floor of existing or proposed tanks.

   A small amount of pressure zone overlap (where one can be served water with sufficient pressure from either zone) should be included at boundaries of each pressure zone.

B. Hydraulic analysis of the System (Dynamic Pressures) shall address the following requirements:

1. Under peak hour demand and no fire flow, minimum pressure should be no less than 40 psi and not exceed 3.5 feet/1,000 ft. head loss in the pipe. Maximum desirable head loss shall be 5.0 feet/1,000 ft. of pipe and maximum allowable head loss shall be no greater than 10 feet/1,000 feet of pipe at peak flow.

2. Under maximum day demand plus fire flow, pressure in the system should not be less than 20 psi for the period of the fire incident (assume tank to be half full). During fire, pumps should be assumed to be off and the fire flow requirement is to be delivered 100% from storage tanks.

3. The maximum desired pressure drop between static pressures and dynamic pressures is 25 psi.

4. At least two sources of water from two different streets should be available for each development (i.e., looped). Two sources from the same transmission line are acceptable if source from a different street is unavailable. No dead-end systems are permitted, unless district's staff agree to it. Looped systems are required as described above.

5. Dead-end water lines are to serve no more than 18 residences. A looped water line is required for 19 or more residences.

6. No more than one fire hydrant on a dead-end line. Minimum line size shall be 8-inches.

7. Approved double check detector assemblies (DCDAs) are required for all fire sprinkler systems. This is particularly important for schools and commercial developments.

8. Dynamic pressures shall be analyzed with reservoir levels half full.

3.2.3 Water Master Plan Peaking Factors

Average Day Demand (ADD)	1.0
Maximum Month Demand (MMD)	1.5 x ADD
Maximum Day Demand (MDD)	1.65 x ADD
Peak Hour Demand (PHD)	2.90 x ADD

3.3 LOCATION, TYPE AND SIZE OF WATER FACILITIES

3.3.1 Distribution Mains

Distribution mains shall be 8-inch to and including 12-inch in size and shall be Class 150 or Class 200, as shown on the plan, polyvinyl chloride (PVC) AWWA C-900 type pipeline.

3.3.2 Transmission Mains

Transmission mains shall be 14-inch and larger in size and shall be either (PVC) AWWA C-905, or steel pipeline and shall require Engineer's approval of type prior to design of system.

3.3.3 Water Valves for Distribution Mains

Water valves for distribution mains (8-inch to and including 16-inch) shall be resilient wedge gate valves. Valves shall be flanged, flange X push on, or push on X push on (in-line valves).

3.3.4 Water Valves for Transmission Main

Water valves for transmission mains 18-inch and larger shall be butterfly valves, FLXFL.

3.3.5 Location of Valves and Appurtenances

A. Water valves shall be placed on all tees and crosses and shall be valved in each direction with manual air releases or blow-offs on appropriate sides (exception will be fire hydrant tees).

B. Fire hydrant locations and model type shall be established by the Fire Marshal and will be placed at common lot lines, end or beginning of curb returns and a minimum of five feet (5') from the edge of driveway.

C. Two-inch (2") manual air release or two-inch (2") blow-off shall be placed at all ends of pipe (i.e., cul-de-sac) as required.

D. Air-vacuum assemblies shall be installed at all the high points and elevated dead-ends of the system.

3.3.6 In-Line Valves

In-line water valving shall be placed every 500 feet (500') for distribution lines and 1,000 feet (1,000') for transmission lines or every 58 feet (58') of elevation difference, whichever occurs first.

3.3.7 Horizontal Location of Water Pipelines

A. Potable Water

Horizontal location: Centerline of potable main to face of curb shall be seven feet (7') on the opposite side of the street of the recycled water system. Potable main shall be on the easterly side of a north-south street and on the southerly side of an east-west street.

B. Recycled Water

Horizontal location: Centerline of recycled main to face of curb shall be twelve feet (12') on the opposite side of the street of the potable water system. Recycled main shall be on the westerly side of a north-south street and on the northerly side of an east-west street.

3.3.8 Vertical Location of Water Pipelines

A. Potable Water

Vertical location: Top of pipe to finish grade of pavement over the potable main shall be:

1. 42 inches (42") in normal residential street.

2. Typically, the potable water main is 12 inches (12") above the recycled water main.

3. In all cases, a minimum of 24 inches (24") shall be required and maintained between the subgrade cut for roadway base material and top of pipe.

4. Design exceptions will be allowed by the District Engineer with written approval.

5. For short distances the District will allow, in some cases, the top of pipe to finish grade depth to be altered to facilitate good design practices—minimum depth of three feet (3') to a maximum depth of five feet (5').

B. Recycled Water

Vertical location: Top of pipe to finish grade of pavement over the recycled main shall be:

1. 54" in normal residential street,

2. Typically, the recycled water main is twelve inches (12") below domestic water main,

3. In all cases, a minimum of thirty inches (30") shall be required and maintained between the subgrade cut of base material and top of pipe,

4. Design exceptions will be allowed by the District Engineer with written approval,

5. For short distances the District will allow, in some cases, the top of pipe to finish grade depth to be altered to facilitate good design practices – minimum depth of three foot (3') to a maximum depth of five feet (5').

3.3.9 Separation Between Water, Sewer, Recycled Water Lines, and Other Underground Utilities

Horizontal and vertical separation of water, recycled water and sewer mains shall adhere to the State of California Department of Health Services "Criteria for the Separation of Water Mains and Sanitary Sewers".

A. Horizontal Separation: Ten-foot (10') minimum clear separation between water, sewer and recycled water mains shall be maintained. Any special situation requiring less separation refer to criteria for the separation of water mains and sanitary sewer per Department of Health Services, and will require District approval.

B. Vertical Separation: Twelve-inch (12") minimum clear separation between water, sewer and recycled water shall be maintained at all crossings, all crossings should be at 90º angles horizontally. Normally, water, sewer, and recycled water shall be located vertically from the streets finish grade surface in the order of the higher quality, i.e., water shall be above recycled, recycled above sanitary sewer.

3.3.10 Water Service and Meter Items

A. Copper tubing shall be used for all service laterals. Minimum service size shall be 1-inch. Maximum copper tubing service size shall be 2-inch (1-1/2 inch copper tubing size is not allowed).

B. No meter is to be placed within any sidewalk or driveway area without specific approval of the District or City Engineer. Any water service found to be within a driveway or sidewalk shall be removed completely and reinstalled at the proper location, at no cost to the District.

C. Where meters and meter boxes are located within slopes, the angle meter stops shall be so located that the meters and boxes will be parallel and flush, respectively, with the finished surface.

D. Before installation of meter by the District, the water service installation must be inspected and approved by the City Inspector.

E. All irrigation meters shall be paid for by the Developer. Payment will be made to the City of Carlsbad Finance Department. A meter application will be processed, after which the District Meter Department will arrange for installation of the meter(s).

F. All non-residential water meters will require a reduced pressure back-flow preventer directly behind the meter.

G. Residential fire flow meters, as required by the Fire Marshal, shall be installed in accordance with the requirements shown on CMWD Standard Drawing 3A.

H. All water meter sizes will be determined by the District based on projected demand.

3.3.11 Providing Required Easements

If an easement is required for construction and/or maintenance of potable water mains, the minimum width shall be 20 feet and the pipeline shall be located in the center of the easement, unless otherwise determined by the District. An easement running parallel with common lot lines shall not be split so as to occur on two lots. Easements shall also be shown on the construction plans. The District will allow occupancy only after all required easements have been deeded and recorded to the District together with any necessary partial reconveyances or subordination agreements.

When facilities such as water service and meters, R.P. backflows, air vacuum assemblies, etc., are to be located at back of sidewalk and/or curb in private streets, the minimum width and extension of the easement shall be five feet (5') beyond the facility.